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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/771,074	02/03/2004	Joel F. Zuhars	137782 (MHM - 15221US01)	1973
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EXAMINER				
BITAR, NANCY				
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/771,074

Applicant(s)

ZUHARS ET AL.

Examiner

NANCY BITAR

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 March 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3 and 5-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3 and 5-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02/03/2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/S5108)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Response to Arguments

1. Applicant's arguments, in the amendment filed 03/21/2008, with respect to the rejections of claims 1-3, 5-20 under 35 U.S.C. 103(a) have been fully considered but are moot in view of the new ground(s) of rejection necessitated by the amendments. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Dekel et al (2002/0172328).

2. Claims 1-3, 5-20 are currently pending.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-3,5-20 are rejected under 35 U.S.C. 103(a) as being anticipated by Strobel et al (US 7050844) in view of Dekel et al (2002/0172328).

As to claim 1, Strobel et al. teaches a method of performing instrument tracking on an image (recognize the position of the instrument, column 2, lines 29-31) comprising:

collecting a plurality of images; computing at least one of a position and orientation of at least one instrument for said plurality of images (step V; coordinates of the two projection images that describe the position of the picture element in the image, figure 1, column 6, lines 3-11); and automatically displaying each image in said collected plurality of images in an image by

image manner to create an animation , wherein said at least one position and orientation of said at least one instrument is projected on each said image (step VI; figure 1; presentation of the picture element at a monitor that defines the position as well the orientation). While Strobel meets a number of the limitations of the claimed invention, as pointed out more fully above, Strobel does not specifically teach the image by image manner to create an animation.

Specifically, Dekel et al. teaches FIG. 4, a patient 10 is positioned within the cone-shaped X-ray beam 12 of the fluoroscope such that an X-ray projection image of the patient's organ 11 is seen on the screen 16. In the calibration phase, the integrated navigation system 35, which comprises a navigation catheter 36, is used to establish the coordinates of the catheter relative to fiducial points of the system (not shown) while X-ray image projection 33 of the catheter are obtained. The fiducial points may be the location of a magnetic field generator or devices mounted on other catheters or on the body surface. Moreover, Dekel teaches the image of the instrument can be simultaneously displayed with the image of an object to be operated on thus enabling an operator to guide the instrument within the object (see paragraph [0017] and [0028-0033] and [0036-0039]). It would have been obvious to one of ordinary skill in the art to automatically display each image in a plurality of images in an image by image manner of Dekel in Strobel presentation order to improve the navigation and localization of the position of tools, probes and catheters in three-dimension relative to a patient's anatomy using conventional fluoroscopy. Therefore, the claimed invention would have been obvious to one of ordinary skill in the art at the time of the invention by applicant.

As to claim 2, Strobel et al. teaches the method of claim 1 wherein said plurality of images comprise a plurality of 2D fluoroscopic images (note that the radiation detectors 6, 7 are fashioned as x-ray image intensifiers or as flat image detectors, column 6, lines 34-38).

As to claim 3, Dekel et al. teaches the method of claim 2 comprising continuously presenting the image by image animation using a display (paragraph [0028-0033] and claim 1).

As to claim 5, Dekel et al. teaches the method of claim 1 comprising calibrating at least one image of said collected plurality of images such that said at least one position and orientation of said at least one image may be accurately displayed (Some location devices measure the position of one or more targets on the tool or instrument, paragraph [0023]).

As to claim 6, Dekel et al. teaches the method of claim 5 comprising selecting at least one calibrated image to be a current image (FIG. 2, the calibration phase).

As to claim 7, Dekel et al. teaches the method of claim 6 comprising computing said at least one position and orientation for said at least one instrument for said current image (paragraph [0029-0030]).

As to claim 8, Strobel et al. teaches the method of claim 1 comprising collecting said plurality of images using at least one moveable collection device (the C-arm is moved into two different angular positions for registering the projection images with the image planes residing differently relative to one another. In this embodiment of the invention, thus, only one C-arm is present with which the angiography projection images are registered first, column 3, lines 45-61, note that the physician is presented with the continuously occurring displacement motion of the instrument position).

As to claim 9, Strobel et al. teaches the method of claim 8 wherein said moveable collection device comprises a C-arm coupled to an imaging device (C-arm system, column 4, lines 32-34).

The limitation of claim 10 has been addressed above except for the following “automatically repeating said selecting, computing and projecting and displaying steps to create an animation using a sequential image by image presentation through said series of 2D images”. Dekel teaches that limitation in (paragraph [0025] and paragraph [0028-0033])

As to claim 11, Strobel et al. teaches the method of claim 10 comprising collecting said series of 2D images using a collection device that moves (the C-arm is moved into two different angular positions for registering the projection images with the image planes residing differently relative to one another. In this embodiment of the invention, thus, only one C-arm is present with which the angiography projection images are registered first, column 3, lines 45-61, note that the physician is presented with the continuously occurring displacement motion of the instrument position).

As to claim 12, Strobel et al. teaches the method of claim 11, wherein said collection device comprises a C-arm coupled to the imaging device (C-arm system, column 4, lines 32-34).

As to claim 13, Dekel et al. teaches the method of claim 10 wherein said series of 2D images comprise a series of 2D fluoroscopic images (It will also be appreciated that the method can be used for multiple planes X-ray fluoroscopy such as bi-plane fluoroscopy, paragraph [0030]).

As to claim 14, Dekel et al. teaches the method of claim 10 comprising continually using said sequential image presentation by image through said series of 2D images in a display (paragraph [0038] and Fig 2).

As to claim 15, Dekel et al. teaches the method of claim 14 comprising projecting said at least one position and orientation of said at least one instrument into at least one image of said series of 2D images (paragraph [0017]).

As to claims 16-17, Strobel et al. teaches the method of incrementing at least said current image and recomputing said at least one position and orientation of said at least one instrument (In order to then determine the x, y and z-coordinates of the catheter tip in the coordinate system (x, y, z) of the reconstruction volume, i.e. of the vessel tree 12, the known projection matrices describing the positions of the two C-arm systems 2, 3, as well as the image coordinates (u.sub.6, v.sub.6) and (u.sub.7, v.sub.7), are determined. The spatial coordinates (x.sub.K, y.sub.K, z.sub.K) describing the spatial position then can be calculated by matrix calculation, column 7, lines 30-38, see also Dekel et al paragraph [0036-0039]).

The limitation of claims 18-20 has been addressed above except for the following” automatically and continuously presenting an image by image display”. Dekel teaches the location of the instrument is continuously monitored by the location device and processed by the computer. As would be obvious to one skilled in the art, the position of the sensor of the location device will be chosen to permit the detection of the instrument and/or the target located on the instrument. The spatial coordinates of the instrument in the frame of reference of the location device are then transformed to generate an X-ray projection image superimposed on the image of the object that is simultaneously displayed on the screen [0029-0030]. Moreover, Dekel teaches

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the computer system continues to display the stored fluoroscope image of the heart. This background image may be displayed either as a static image triggered by the patient's ECG or as a dynamic cine loop synchronized with the patient's cardiac cycle through the ECG. The coordinates of the navigation catheter are read from the navigation system either on a continuous basis or in response to a trigger signal generated from the patient's ECG signal. The system then performs a mathematical transform of the navigation coordinates into the fluoroscope coordinates using the previously generated calibration information. The system then generates an image of the navigation catheter and displays it simultaneously with the stored fluoroscope image or sequences of images of the heart, paragraph [0039])

Any inquiry concerning this communication or earlier communications from the examiner should be directed to NANCY BITAR whose telephone number is (571)270-1041. The examiner can normally be reached on Mon-Fri (7:30a.m. to 5:00pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bhavesh Mehta can be reached on 571-272-7453. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Bhaves M Mehta/
Supervisory Patent Examiner, Art Unit 2624

Nancy Bitar

05/28/2008